WHAT IS CLAIMED IS

1. An actuator comprising: a plurality of displacing devices for generating displacements; a compound member connected to the displacing devices and for compounding displacements of the displacing devices; a base member for folding base ends of the displacing devices at which the compound member is not connected; a pressing member for pressing the compound member to an object to be driven; and a driver for resonantly driving the displacing devices so as to move the compound member along an elliptic or a circular trail.

2. The actuator in accordance with claim 1, wherein a natural frequency of the displacing devices in a first natural vibration mode in which the displacing devices are resonantly vibrated in the same phase substantially coincides with a natural frequency of the displacing devices in a second natural vibration mode in which the displacing devices are resonantly vibrated in the opposite phase.

3. The actuator in accordance with claim 2, wherein a mass of the compound member is designated by a symbol "M", a length of the displacing device is designated by a symbol "L", a height of the displacing device is designated by a symbol "H", and a mass of the displacing device is designated by a symbol "m",

$$M=(L^2/H^2-0.88)m/2.63$$

is composed.

4. The actuator in accordance with claim 2, wherein a mass of the compound member is designated by a symbol "M_c", a mass of each displacing device is designated by a symbol "m", a spring

constant of the displacing device in the expansive deformation is designated by a symbol "k_1", a spring constant of the displacing device in the bending deformation is designated by a symbol "k_3", a moment of inertia of the base member is designated by a symbol "I_z", a rotation radius of the base member is designated by a symbol "R", and an equivalent mass of the base member converted to a cantilever is designated by a symbol "M_b'",

$$(k_1/(1-p))/(M_c+(1-p)m/3)=(k_1/(1-q)+k_3)/(M_c+(1-q)m/3+m/2)$$

$$p=(M_c+m/3)/(M_c+I_z/R^2+2m/3)$$

$$q=(M_c+5m/6)/(M_c+M_b'+7m/6)$$

are composed.

5. The actuator in accordance with claim 1, wherein the displacing device includes an elastic member as a part thereof.

6. An actuator comprising: a first displacing device; a second displacing device; a compound member connected to top ends of the first displacing device and the second displacing device and for compounding displacements of the first displacing device and the second displacing device; and a driver for resonantly driving the displacing devices so as to move the compound member along an elliptic or a circular trail; and wherein

the driver drives the first displacing device and the second displacing device by driving signals respectively having a frequency included in an overlapped region of a first frequency band and a second frequency band;

the first frequency band is defined as a region between the

resonance frequency and the antiresonance frequency of the first displacing device in which a phase difference between a phase of a voltage of the driving signal and a phase of a current flowing in the first displacing device is substantially constant; and

the second frequency band is defined as a region between the resonance frequency and the antiresonance frequency of the second displacing device in which a phase difference between a phase of a voltage of the driving signal and a phase of a current flowing in the second displacing device is substantially constant.

7. The actuator in accordance with claim 6, wherein the frequency of the driving signals is a value at the center between a first frequency and a second frequency; the first frequency is the smaller one of the resonance frequencies of the first displacing device and the second displacing device; and the second frequency is the smaller one of the antiresonance frequencies of the ~~firs~~ first displacing device and the second displacing device.

8. The actuator in accordance with claim 6, wherein the phase of the driving signal for driving the first displacing device ~~gas~~ has a phase difference with respect to the driving signal for driving the second displacing device.

9. The actuator in accordance with claim 6, further comprising current sensors respectively for sensing currents flowing in the first displacing device and the second displacing device.

10. An actuator comprising: a first displacing device; a second displacing device; a compound member connected to top ends

of the first displacing device and the second displacing device and for compounding displacements of the first displacing device and the second displacing device; and a driver for resonantly driving the displacing devices so as to move the compound member along an elliptic or a circular trail; and wherein

the driver drives the first displacing device and the second displacing device by driving signals respectively having a frequency included in a frequency band in the vicinity of resonance frequencies of the first displacing device and the second displacing device at which a displacement of the first displacing device is substantially the same as that of the second displacing device.

11. The actuator in accordance with claim 10, wherein a phase difference is provided between the driving signals in a manner so that a current flowing in the first displacing device has a predetermined phase difference with respect to a current flowing in the second displacing device.

12. The actuator in accordance with claim 10, further comprising current sensors respectively for sensing currents flowing in the first displacing device and the second displacing device.

13. A method for driving an actuator comprising: a first displacing device; a second displacing device; a compound member connected to top ends of the first displacing device and the second displacing device and for compounding displacements of the first displacing device and the second displacing device; wherein

the first displacing device and the second displacing device are

driven in a manner so as to move the compound member along an elliptic or a circular trail by using driving signals respectively having a frequency included in an overlapped region of a first frequency band and a second frequency band;

the first frequency band is defined as a region between the resonance frequency and the antiresonance frequency of the first displacing device in which a phase difference between a phase of a voltage of the driving signal and a phase of a current flowing in the first displacing device is substantially constant; and

the second frequency band is defined as a region between the resonance frequency and the antiresonance frequency of the second displacing device in which a phase difference between a phase of a voltage of the driving signal and a phase of a current flowing in the second displacing device is substantially constant.

14. The method for driving the actuator in accordance with claim 13, wherein the frequency of the driving signals is a value at the center between a first frequency and a second frequency; the first frequency is the smaller one of the resonance frequencies of the first displacing device and the second displacing device; and the second frequency is the smaller one of the antiresonance frequencies of the ~~firs~~ first displacing device and the second displacing device.

15. The method for driving the actuator in accordance with claim 13, wherein the phase of the driving signal for driving the first displacing device gas a phase difference with respect to the driving signal for driving the second displacing device.

16. A method for driving an actuator comprising: a first displacing device; a second displacing device; a compound member connected to top ends of the first displacing device and the second displacing device and for compounding displacements of the first displacing device and the second displacing device; wherein

the first displacing device and the second displacing device are driven in a manner so as to move the compound member along an elliptic or a circular trail by using driving signals respectively having a frequency included in a frequency band in the vicinity of resonance frequencies of the first displacing device and the second displacing device at which a displacement of the first displacing device is substantially the same as that of the second displacing device.

17. The method for driving the actuator in accordance with claim 10, wherein a phase difference is provided between the driving signals in a manner so that a current flowing in the first displacing device has a predetermined phase difference with respect to a current flowing in the second displacing device.